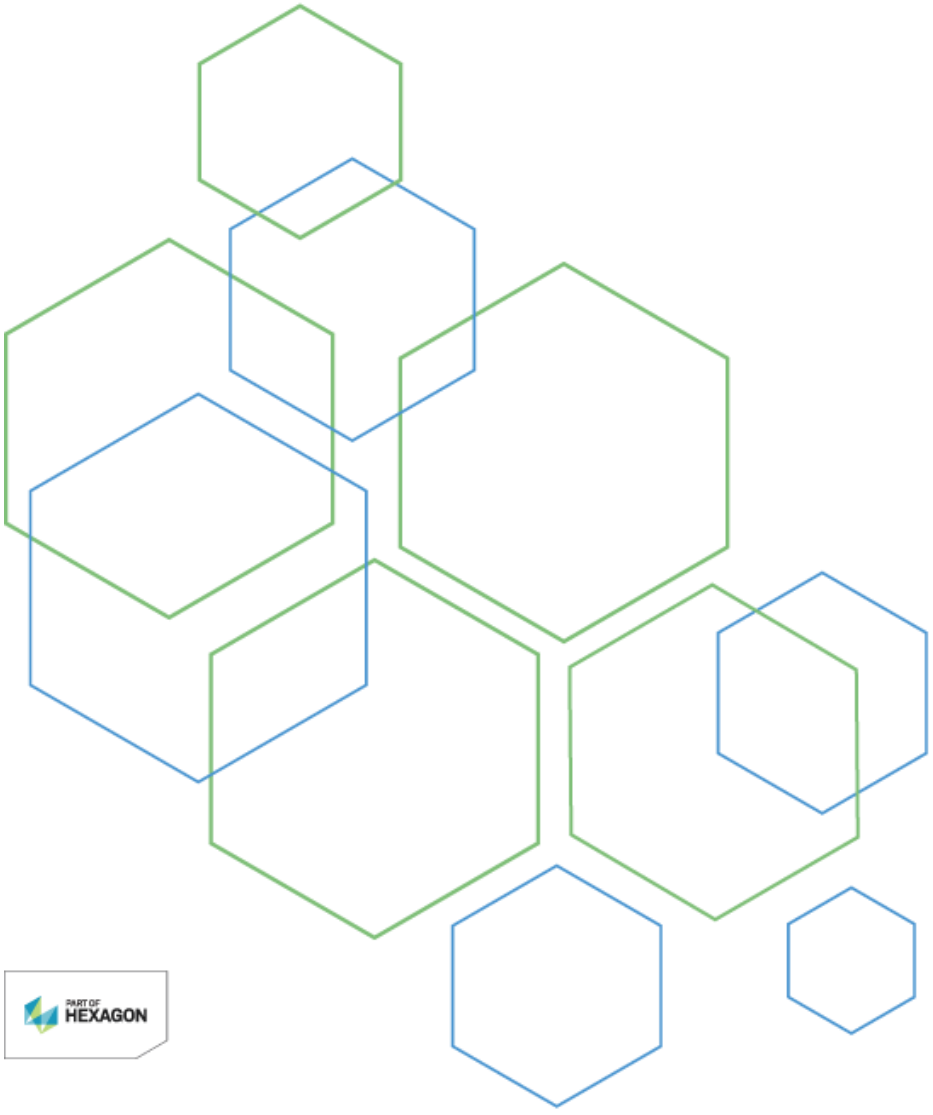
INTERGRAPH Smart 3D

Tribon

Interface Guide



PART OF HEXAGON

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Contents

Preface

This document describes how to integrate Tribon® data with Intergraph Smart™ 3D. This document pulls together information from several other Intergraph Smart™ 3D administrative and user documentation guides.

Documentation Comments

For the latest support information for this product, comments or suggestions about this documentation, and documentation updates for supported software versions, please visit *Intergraph Smart Support* (*https://smartsupport.intergraph.com*).

What's New in Tribon Interface

The following changes have been made to the Tribon® Interface Guide.

Version 2016 (11.0)

- Added a new attribute, **<Assembly>**, to the **<PlateGroup>** (on page 25), **<BracketGroup>** (on page 27), **<StiffenerGroup>** (on page 29), **<PillarGroup>** (on page 33), **<FaceplateGroup>** (on page 35), and **<FlangeGroup>** (on page 37). (P2 CP:240006)
- You can now import Tribon clips (both Mould and Non-Mould) as regular plate parts in **Smart 3D** software. For more information, see *Importing Data from Tribon* (on page 11) (P2 CP:258528)
- The new default Smart 3D cross-section used if there is not a cross-section type mapped to an XML cross-section is 100x9. For more information, see *Reference Data XML Tags* (on page 20). (P3 CP:262672)

SECTION 1

Tribon Interface

Using the Smart 3D Tribon Interface, you can import structural Tribon Initial Design data (defined in XML format) into Intergraph Smart™ 3D. The imported Tribon data is background structure used for planning and outfitting work. Smart 3D only supports XML in Schema V3 format, which is output by the Basic Design modules of Tribon Initial Design M3 (Version 1.3).

The **Intergraph Smart™ 3D Tribon Interface** (SEBY812AG) is a separately purchasable product from Intergraph that you can add to a Smart 3D installation. Therefore, prior to installing the Smart 3D Tribon Interface, verify that Smart 3D has been installed. You cannot install the Smart 3D Tribon Interface without first having installed Smart 3D.

After you install Smart 3D Tribon Interface, the **File** > **Import** > **Ship Structure** command is available in the Molded Forms and Structural Detailing tasks to import Tribon XML files. Various import options are defined in an initialization file, TribonImport.ini, delivered in the *[Reference Data Folder]*\SharedContent\Data\TribonTranslators\MappingFiles folder. For more information about the initialization file, see *Tribon Import Initialization File* (on page 10). To ensure that profile cross sections and materials are mapped between Smart 3D and Tribon, you need to provide a mapping spreadsheet. For more information, see *Import Translation Map Workbook* (on page 17). During the import, a log file is generated in the system temp folder. The log file provides information about the objects that failed to import. For more information on importing Tribon data into Smart 3D, see Import Ship Structure.

In some cases, the data in the Tribon XML files must be repaired. A custom command is provided for this repair process. You can re-import the data into Smart 3D after repairing it.

IMPORTANT The integrity of the source data is the responsibility of the generating software (in this case, Tribon). Users who repair the data with the custom command assume liability and responsibility for the results. Intergraph does not assume any liability for the data modifications.

Install Smart 3D Tribon Interface

Installing the **Smart 3D Tribon Interface** component allows you to import Tribon Initial Design M3 structural data into Smart 3D for planning and outfitting purposes.

Intergraph Smart™ 3D Tribon Interface (SEBY812AA) is a separately-licensed product. Please contact Intergraph Support for licensing information.

Prior to installing Smart 3D on a workstation computer, verify that the workstation computer meets the required hardware and software requirements and that all prerequisite software has been installed. For more information, see Smart 3D Workstation Recommendations in the *Intergraph Smart™ 3D Installation Guide*. For more information about the prerequisite software, see Loading Prerequisite Software on the Client.

Remove the older version of Smart 3D before loading the new version. For more information, see Remove Smart 3D Software in the *Intergraph Smart™ 3D Installation Guide*.

You must have administrator privileges on the computer to install the software. We recommend using the **Run as Administrator** option.

If you have not already installed and configured SmartPlant License Manager on your computer, we recommend doing so before installing Smart 3D.

★ IMPORTANT

- If you are using material handling mode, you must install Intergraph SmartSketch 2016 (9.0 or later) before installing Smart 3D. If you install Smart 3D first, then Smart 3D will not work properly. You must separately purchase SmartSketch (SGBY297AV).
- Smart 3D requires the SmartPlant License Manager software for concurrent licensing for both the core Smart 3D product and for each module. This licensing software is delivered on its own DVD that comes with your Smart 3D DVD. For more information about using and configuring concurrent licensing, see the *SmartPlant License Manager Installation and User's Guide* (SPLMInstall_UserGuide.pdf).
- During setup, the %temp% value is defined as the user %temp% of the person who runs the setup. In Windows, each user's C:\Documents and Settings\username\Local Settings\Temp is protected from other Windows users. Consequently, you must set the system environment variable TEMP value to a folder location where everyone has write access (for example, c:\temp). For more information about editing system variables, see the Help and Support Center (click Start > Help and Support Center from the Windows task bar).

1. Insert the **Intergraph Smart 3D** DVD. If the DVD does not start automatically, right-click **Setup.exe** in the root folder of the DVD and select **Run as administrator**.
2. Click **Additional Software**, and the select the optional software that you need to install, if any:

   Install SmartPlant Schema Component
   Install PDS Export Tools
3. Click **Back** if needed.
4. Click **Full Installation**.
5. Type your name or organization information.
6. Select the components to install on this computer:
   - **Smart 3D Installation** - Installs the Smart 3D client component that contains the modeling tasks such as Common, Piping, Equipment, Structure, and so forth.
     - **Project Management** - Installs the **Project Management** client used for creating models, managing access control, and upgrading databases. Select this option for an administrator's computer. You must also install the **Server Connectivity** option (below) and the Microsoft SQL Server client tools. The Microsoft SQL Server client tools are not required on computers where **Project Management** is not installed or if you are using Oracle as your database provider.
     - **Bulkload Reference Data** - Installs sample Microsoft Excel reference data workbooks and the utilities needed to bulkload the workbooks into the Catalog task. Select this option for people working with reference data and the Catalog task. You must also install the **Server Connectivity** option if you select this option.

- **Piping Specification Remote Access Server** - Installs the necessary software for correlating piping specification data between Smart 3D and SmartPlant P&ID. This option sets up the computer as a remote access server by registering the SP3DPipingSpecRemoteAccessServer COM+ component. For more information about the P&ID integration capabilities of the software, see Integrating with SmartPlant P&ID in the *Intergraph Smart™ 3D Installation Guide*.

  ★ IMPORTANT If you select this option, make sure that the Distributed Transaction Coordinator service is not set to **Disabled**. The Piping Specification Remote Access Server installation will fail if this service is disabled.

- **Database Interference Detection Service** - Installs the software required for database interference detection. You must configure this service through Windows Services. Requires the **Project Management** and the **Server Connectivity** components. For more information, see Interference Checking Setup.

- **Server Connectivity** - Installs required database connectivity components for **Project Management**, the Bulkload Utility, **Piping Specification Remote Access Server**, and the **Database Interference Detection Service**.

- **64-bit Services** - Installs the 64-bit version of the Interference Checking and Drawings Batch Services components.

  ★ IMPORTANT 64-bit Services cannot be uninstalled individually. You must remove all of Intergraph Smart 3D from the computer to remove the 64-bit Services component.

- **Name Generator Installation** - Installs the 32-bit version of the Name Generator. Install this one if you are installing the Name Generator on a computer where the Oracle 32-bit client is installed.

- **Name Generator 64-bit Installation** - Installs the 64-bit version of the Name Generator. Install this one if you are installing the Name Generator on a computer running a server operating system, you are using Microsoft SQL Server, or you are installing on an Oracle database server.

  ★ IMPORTANT

  - For more information about which version of the Name Generator you need and about the Name Generator in general, see Name Generator Service Setup.
  - Make sure that the Distributed Transaction Coordinator service is not set to **Disabled**. Name Generator installation will fail if this service is disabled.

- **Reference Data Installation** - Installs the reference data needed to run Smart 3D. You should pick one server on which to install the reference data. Do not install reference data on each client or administrator computer. For more information, see Reference Data Setup.

- **Intergraph Smart 3D PDS Model & Data Translators Installation** - Installs the **PDS Model & Data Translators** (licensed-separately, SEBY801) component that further extends the PDS integration capabilities by allowing you to export Piping, HVAC, Electrical, Equipment, and Structure model data from PDS into Smart 3D. For more information, see Install Smart 3D PDS Model & Data Translators.

- **Intergraph Smart 3D Tribon Interface Installation** - Installs the **Tribon Interface** (licensed-separately, SEBY812) component that allows you to import Tribon Initial Design M3 structural data into Smart 3D in marine mode for planning and outfitting purposes. For more information, see Smart 3D Tribon Interface Setup.

- **Programming Resources Installation** - Installs the Programming Resources component which provides developers with the tools necessary to customize the software by creating custom commands or custom programs. For more information, see Programming Resources Setup.

★IMPORTANT Serial numbers are used for product identification only. A license key is required to run the software. For more information about installing and using SmartPlant License Manager, see the *SmartPlant License Manager Installation and User's Guide* (SPLMInstall_UserGuide.pdf).

7. Read the license agreement. Click to agree to the Software License Agreement, and then click **Install**.

   The selected options are installed on the computer.

8. Click **Finish**.

   ★IMPORTANT *If you installed Smart 3D on a computer with version 4.5.2 of the .NET Framework installed, you must reboot your computer after installation completes.*

Tribon Import Initialization File

The TribonImport.ini initialization file, delivered in the [*Reference Data Folder*]\SharedContent\Data\TribonTranslator\MappingFiles folder, controls the following import options for the import of Tribon data into Smart 3D. The mapping file and the initialization file must be in the same file path.

OverrideReflectedInstanceToAsDefined

Overrides the **Instance** property value **Reflected** to **AsDefined** and imports the data. Available values:

- **0** (Default) - False. Suppress the override of the **Instance** property value.
- **1** - True. Override the **Instance** property value **Reflected** to **AsDefined** and import the data.

AssignImportedPartsToPlanningAssembly

Creates a planning assembly for each Tribon block and assigns all the imported parts under the block as children to that assembly. Available values:

- **0** (Default) - False. Suppress the creation of the planning assembly and assignment of imported parts.
- **1** - True. For each Tribon block, a planning assembly is created and all the imported parts under the block are assigned to that assembly.

MemoryThresholdForImport

Sets the amount of memory (in percentage) to be used for the import process beyond which the import is aborted. Setting more memory will import more blocks but might crash the import process and Smart 3D. Specify a value in the range of **10** to **90**. The default value is **80**.

SECTION 2

Importing Data from Tribon

The **File** > **Import** > **Ship Structure** command, available in the Molded Forms and Structural Detailing tasks, imports the following objects from the Tribon XML file:

Imported Tribon Object	Similar Smart 3D Object
Cutout	Sketched feature (Structural Detailing)
Notch	Edge or corner feature (Structural Detailing)
Seam	Design seam (Molded Forms), straking seam (Structural Detailing), planning seam (Planning)
Hole	Opening (Molded Forms), hole (Hole Management)
Plate part	Plate part, child to plate system (Molded Forms)
Bracket	Bracket (Molded Forms, Structural Detailing)
Face plate	Plate part (Structural Detailing)
Stiffener part	Profile stiffener part, child to profile stiffener system (Molded Forms)
Pillar	Beam (Molded Forms)
Flange	Edge reinforcement (Molded Forms, Structural Detailing)
Clips(ClipNonMould, ClipMould, ClipTop)	Plate Part, Child to PlateSystem (Molded Forms)

The imported objects are created in a persistent system hierarchy that you cannot modify after the import. The objects are background structure used for planning and outfitting work. For more information on the imported data, see *XML Data Descriptions* (on page 19).

★ **IMPORTANT** You cannot copy, paste, or move imported ship structure objects in Smart 3D.

In addition to data objects, you can optionally import several grouping nodes. These nodes appear in the hierarchy on the **System** tab in the **Workspace Explorer**, but do not appear on the **Assembly** tab. The following grouping types of objects are available from the imported data:

- Root Node (block)
- Assembly Node (curved panel or plane panel)

Mapping Imported Tribon Data to Smart 3D Data

Because Tribon and Smart 3D often use different names for their cross sections and materials, you need to map the information between the two applications using the Microsoft Excel workbook delivered in *[Reference Data Folder]*\SharedContent\Data\TribonTranslator\MappingFiles\SM_Mapping.xls. This workbook provides the initial mapping between material and cross section names.

Because different sources can require different mappings, you can customize SM_Mapping.xls to change the mapping during the import of the XML. For more information, see *Import Translation Map Workbook* (on page 17).

Filtering Imported Tribon Data

When you click **Tools** > **Select by Filter**, you can use the **Object Type** tab on the **Filter Properties** dialog box and navigate to **Ship Structure (Imported)** in the tree view. You can then customize filters to include the needed Tribon objects.

Copying and Pasting Tribon Data

You cannot copy and paste imported Tribon objects.

Modifying Imported Tribon Data

You cannot modify imported Tribon objects in the Molded Forms or Structural Detailing tasks. If modifications are needed, you must modify the objects in Tribon and re-import an XML file. The modified objects will be re-imported, replacing the objects from the original import.

In addition, all property data imported from Tribon is read- only, except for the name. You can, however, add custom properties to the schema and edit those custom properties after the import operation. The name can be changed on the **Properties** dialog box of the imported object.

Deleting Imported Tribon Data

You can delete individual plates, brackets, or other imported objects from the model. However, if you re-import the XML file that contained the original objects, all the deleted objects will re-appear in the model.

Managing Imported Tribon Data in the Planning task

You can assign Tribon objects to assemblies and blocks in the Planning task. You can do this manually or by using the **Block Assignment** command. If Tribon grouping nodes are imported, they only appear on the **System** tab in the **Workspace Explorer**, and cannot be used in the Planning task.

When doing a re-import of the Tribon data, the software does not change the Smart 3D relationships within the Planning task (assembly/block assignments). Only plate parts, brackets, stiffener parts, pillars, face plates, and flanges are available for management in the Planning task.

If you set the **AssignImportedPartsToPlanningAssembly** option in the initialization (.ini) file to **1**, when you import a Tribon XML file, a Planning assembly is created for each Tribon block in the XML file and all the parts under the block are assigned to the corresponding assembly. You can manually modify these assemblies if needed. When you re-import the XML file, you must set the **AssignImportedPartsToPlanningAssembly** value to 0 in order to retain the manual changes done for the assemblies. If you fail to take the above precaution, the manually assigned

parts are reassigned to the corresponding planning assembly with respect to the Tribon block in the XML file. For more information, see *Tribon Import Initialization File* (on page 10).

IMPORTANT If you set the **AssignImportedPartsToPlanningAssembly** option to 1, you must create the B0 planning root block before the import operation so that the software automatically creates planning assemblies during the import of the Tribon XML file.

Referencing Imported Tribon Data

Although the imported objects are read-only, they can be used for all referencing functionality such as:

- Placing a support on an imported profile in the Hangers and Supports task.
- Connecting a hanger to an imported object in the Hangers and Supports task.
- Placing a penetration hole trace on an imported plate, but not actually cutting the imported plate, in the Hole Management task.
- Placing equipment with mating relationships to imported objects in the Equipment and Furnishings task.
- Finding interferences between imported objects and Smart 3D objects by interference checking (both local and server).
- Generating drawings and reports that include imported data in drawings in the Drawings and Reports task.

IMPORTANT

- Systems created in the Molded Forms task and parts created in the Structural Detailing task cannot use imported objects as references or boundaries.
- Imported objects cannot be detailed in the Structural Detailing task or manufactured in the Structural Manufacturing task.

Import Ship Structure (File Menu)

File > **Import** > **Ship Structure**, available in the Molded Forms and Structural Detailing tasks, imports Tribon marine structure XML data into Smart 3D for planning and outfitting work.

To use this command, you must purchase and install the **Intergraph Smart™ 3D Tribon Interface** (SEBY812AG) from Smart 3D. Please contact Intergraph Support for licensing information.

Before you can import the data into Smart 3D, you must export the data from Tribon Initial Design Version M3 (Version 1.3). Smart 3D only supports XML in Schema V3 format.

Import Ship Structure Dialog Box (on page 14)

Import ship structure data

1. Export data from Tribon Initial Design to create an M3 XML file.
2. In Smart 3D, select **File** > **Import** > **Ship Structure**.

   *The **Import Ship Structure** dialog box appears.*
3. Click the button next to the **XML file or path** box to navigate to the appropriate folder location, and do one of the following:

   Click **Open** to process all of the valid XML files in the folder.

   OR

   Select the individual XML file to use for import, and then click **Open**.
4. Click the button next to the **Map file** box to select the XLS map workbook to use for import, and then click **Open**.
5. Select a system to use as the parent for the imported data.
6. Click **OK** to import the Tribon data as specified, or click **Submit Job** to run the import as a batch job.

NOTE For more information about setting up the batch service, see *Installing Batch Services* in the *Intergraph Smart™ 3D Installation Guide*.

Import Ship Structure Dialog Box

Sets options for importing Tribon XML data.

XML file or path

Specify the name of and path to the XML file exported from Tribon. To process multiple files simultaneously, specify the name of and path to the folder that contains the XML files to import. Alternatively, you can use the browse feature and navigate to the file or folder of files to be used for import.

Map file

Specify the name of and path to the mapping file between the Tribon XML data and the Smart 3D data in the catalog. For more information, see *Import Translation Map Workbook* (on page 17).

System

Select a system in the Smart 3D model under which to place the imported data.

SECTION 3

Repairing Tribon Data

The Tribon translator software includes a command that you can use to repair the data in Tribon XML files. Examples of data to repair include:

- Instance properties
- Profile part and seam location

IMPORTANT The integrity of the source data is the responsibility of the generating software (in this case, Tribon). When you repair the data with this command, you assume liability and responsibility for the results. Intergraph does not assume any liability for the data modifications.

See Also

Repair Tribon XML (Tools Menu) (on page 15)

Repair Tribon XML (Tools Menu)

Tools > **Repair Tribon XML** modifies data in Tribon XML files. You can then import the modified data into Smart 3D.

Repair Tribon XML Dialog Box **(on page 16)**

Repair Tribon data

1. Import Tribon data from an XML file. For more information, see Import Ship Structure.
2. If you see errors in the imported geometry, perform the following steps.
3. Click **Tools** > **Repair Tribon XML**.
4. On the **Repair Tribon XML** dialog box, specify the input file, output file, and log file for the repair process.
5. Select the curved panels to repair.
6. Check the repair options as needed.
7. Click **OK**.

Re-import the data using the repaired XML file. Objects that are different from the previous import are automatically updated in the model.

Repair Tribon XML Dialog Box

Sets options for repairing Tribon data.

Files

Input XML file

Specify the import file.

Output XML file

Specify the output file. You can import this file into Smart 3D using the **File** > **Import** > **Ship Structure** command.

Log File

Specify a log file that stores information about the repair process.

Panel

Curved Panels

Select this box to choose curved panels, which are panels defined on a sculpted, not flat, surface.

Plane Panels

This option is not available in this release.

Select the curved panels to be modified in the xml

Click the panels to repair.

Options

Change instance property of panel to As Defined

Changes the instance property to **AsDefined**. This property specifies the position of objects relative to their defining geometry. The different values for this property can be:

- **AsDefined** - The objects are located where they were defined.
- **Reflected** - If the objects were defined on the port side, they are actually on the starboard side. If the objects were defined on the starboard side, they are actually on the port side.
- **Both** - The objects are symmetrical with respect to the origin and are located on both sides.

Move profile parts to other side of center line (Change Y value)

Reflects the profile parts about the Y-axis so the parts are in the correct location.

Move seams to other side of centerline (Change Y value)

Reflects the seams about the Y-axis so the parts are in the correct location.

The other options in this section are not available in this release of the software.

APPENDIX A

Importer Workbooks

The **File** > **Import** > **Ship Structure** command use the Microsoft Excel workbook *[Reference Data Folder]*\SharedContent\Data\TribonTranslator\MappingFiles.xls to map material names and cross section names between Tribon and Smart 3D. You can use the delivered workbook without editing if you have not customized any of the Tribon or Smart 3D material or cross section names. However, if you have customized data, you must edit the workbooks to match your changes. For more information, see *Import Translation Map Workbook* (on page 17).

Import Translation Map Workbook

The Microsoft Excel workbook named **SM_Mapping.xls** is delivered in the *[Reference Data Folder]*\SharedContent\Data\TribonTranslator\MappingFiles folder. This workbook maps Tribon material and cross-section names to Smart 3D material and cross-section names.

The Cross Section worksheet maps profile cross-section names between the Tribon XML file and Smart 3D.

Cross Section Worksheet (on page 17)

The Material worksheet maps Tribon material names to Smart 3D material names.

Material Worksheet (on page 18)

Cross Section Worksheet

The **Cross Section** sheet of the **SM_Mapping.xls** workbook maps Tribon profile cross-section names in the XML file to Smart 3D profile cross-section names.

Section Name

Type the Smart 3D profile cross-section name.

Imported Family Name

Type the Tribon profile cross-section name as it appears in the XML file.

NOTE The last item listed for each section type is the default value for that section type.

Material Worksheet

The **Material** sheet of the **SM_Mapping.xls** workbook maps Tribon materials in the XML file to Smart 3D materials.

Material Type

Type the Smart 3D material type.

Material Grade

Type the Smart 3D material grade.

Imported Material Grade

Type the Tribon material name as it appears in the XML file.

APPENDIX B

XML Data Descriptions

Imported and exported XML data is in the following general format:

```
<Ship Version="1.3">
      <Material Grade="grade*name"/>
      .
      .
      <BarSection BarSectionId="section*name">...</BarSection>
      .
      .
      <HoleDef HoleDefId="hole*name">...</HoleDef>
      .
      .
      <NotchDef NotchDefId="notch*name">...</NotchDef>
      .
      .
      <Block ObjId="block*name">...</Block>
      .
      .
</Ship>
```

Reference data for material, profile cross-sections, holes, and features is contained within the **<Material>**, **<BarSection>**, **<HoleDef>**, **<CutoutDef>**, and **<NotchDef>** tags.

Reference Data XML Tags (on page 20)

Model data is contained in additional tags within the **<Block>** tag. Each data type has additional parameters and options.

Model Data XML Tags (on page 21)

Attribute Naming Between Smart 3D and Imported Structure

In Smart 3D, plate and profile parts have attributes on their edges, faces, and vertices. When objects are connected, the needed attributes are associated with the connection.

Because imported structure cannot be modified in Smart 3D, it is typically used as background structure for equipment, piping, and other outfitting. As a result, connections are created between Smart 3D outfitting and the imported structure. Attributes are also needed for the imported structure. The unique **ObjId** and **CompId** of plate **Limit**, **NotchRef**, **CutoutRef**, and **HoleRef** attributes are used to name edges and vertices. Edges are collected to name plate faces. For stiffeners, cross-sections from the catalog are also used to name the edges, faces, and vertices. These names must remain consistent so that the structure is properly processed if it is re-imported, and connections and connected outfitting are not deleted.

Reference Data XML Tags

<Material>

Defines a material grade.

```
<Material Grade="A"/>
.
.
<Material Grade="A32"/>
.
.
```

Tribon material grades are mapped to Smart 3D material grades using the import translation map worksheet. For more information, see *Material Worksheet* (on page 18).

<BarSection>

Defines a profile cross-section.

```
<BarSection BarSectionId="FlatBar100*10">
      <FlatBar Height="100" Width="10"/>
</BarSection>
.
.
<BarSection BarSectionId="LBar350*100*12*17">
      <LBar Height="350" Width="100" WebThickness="12"
            FlangeThickness="17"/>
</BarSection>
.
.
```

Each set of **<BarSection>** tags contains the cross-section name and dimension parameters. The names are mapped to Smart 3D cross-section names using the import translation map worksheet. Dimensions are ignored on import and created on export. For more information, see *Cross Section Worksheet* (on page 17).

NOTES

- If there is a Smart 3D cross-section type, but not a specific Smart 3D cross-section size to map to an XML cross-section, then the default cross-section in the worksheet for that cross-section type is used.
- If there is not a Smart 3D cross-section type to map to an XML cross-section, then the default Smart 3D cross-section of F 100x9 is used.
- The XML cross-section parameters (such as height, width, and web thickness) are compared to the mapped Smart 3D cross-section. If they are equal, then the web and flange contours read are used to apply end cuts to stiffeners. If they are not equal, then the web and flange contours and end cuts are ignored by Smart 3D.

<HoleDef>

Defines a standard hole cut.

```
<HoleDef HoleDefId="D60">
```

```
      <Circular Height="60"/>
</HoleDef>
.
.
<HoleDef HoleDefId="HO700*500">
      <Manhole Height="700" Width="500"/>
</HoleDef>
.
.
```

<NotchDef>

Defines a standard edge or corner feature.

```
<NotchDef NotchDefId="R125">
      <R Radius="125"/>
</NotchDef>
.
.
<NotchDef NotchDefId="VU131*100*50">
      <VU Width="131" Height="100" Radius="50"/>
</NotchDef>
.
.
```

<CutoutDef>

Defines a standard sketched feature or profile slot.

```
<CutoutDef CutoutDefId="R125">
      <R Radius="125"/>
</CutoutDef>
.
.
```

Model Data XML Tags

All model geometry and objects are defined within the **<Block>** tag in the following general format:

```
<Block ObjId="Block1">
      <Extent>...</Extent>
      <PlanePanel ObjId="810-000" DataType="181"
Instance="AsDefined">...</PlanePanel>
      .
      .
      <CurvedPanel ObjId="CG810-1" DataType="501"
Instance="Both">...</CurvedPanel>
      .
      .
</Block>
```

<*PlanePanel*> (on page 22)

<*CurvedPanel*> (on page 23)

<PlanePanel>

Defines all geometry and objects for planar plates and their child stiffeners.

```
<PlanePanel ObjId="810-000" DataType="181" Instance="AsDefined">
      <Extent>...</Extent>
      <CoordSys>...</CoordSys>
      <Boundary>...</Boundary>
      <PlateGroup GroupId="6">...</PlateGroup>
      .
      .
      <SeamGroup GroupId="4">...</SeamGroup>
      .
      .
      <NotchGroup GroupId="9">...</NotchGroup>
      .
      .
      <CutoutGroup GroupId="12">...</CutoutGroup>
      .
      .
      <HoleGroup GroupId="15">...</HoleGroup>
      .
      .
      <StiffenerGroup GroupId="17>...</StiffenerGroup>
      .
      .
      <BracketGroup GroupId="20">...</BracketGroup>
      .
      .
      <PillarGroup GroupId="25">...</PillarGroup>
      .
      .
      <FaceplateGroup GroupId="26">...</FaceplateGroup>
      .
      .
      <FlangeGroup GroupId="29">...</FlangeGroup>
      .
      .
</PlanePanel>
```

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

Instance - Defines the creation method for an object.

- **AsDefined** - The object is created only on the defined side of the global Y-axis (the longitudinal centerline).
- **Reflected** - The object is created only by reflecting it from the defined side about the global Y-axis (the longitudinal centerline).

- **Both** - The object is created only on the defined side and by reflecting it about the global Y-axis (the longitudinal centerline).

<*CoordSys*> (on page 24)

<*Boundary*> (on page 24)

<*PlateGroup*> (on page 25)

<*BracketGroup*> (on page 27)

<*StiffenerGroup*> (on page 29)

<*SeamGroup*> (on page 39)

<*NotchGroup*> (on page 43)

<*HoleGroup*> (on page 40)

<*PillarGroup*> (on page 33)

<*FaceplateGroup*> (on page 35)

<*FlangeGroup*> (on page 37)

<CurvedPanel>

Defines all geometry and objects for curved plates and their child stiffeners. A local coordinate system is not defined for a curved panel. The global coordinate system is used.

```
<CurvedPanel ObjId="CG810-1" DataType="501" Instance="Both">
      <Extent>...</Extent>
      <Boundary>...</Boundary>
      <SeamGroup GroupId="1">...</SeamGroup>
      <PlateGroup GroupId="2">...</PlateGroup>
      .
      .
      <StiffenerGroup GroupId="4">...</StiffenerGroup>
      .
      .
</CurvedPanel>
```

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

Instance - Defines the creation method for an object.

- **AsDefined** - The object is created only on the defined side of the global Y-axis (the longitudinal centerline).
- **Reflected** - The object is created only by reflecting it from the defined side about the global Y-axis (the longitudinal centerline).

- **Both** - The object is created only on the defined side and by reflecting it about the global Y-axis (the longitudinal centerline).

<*Boundary*> (on page 24)

<*PlateGroup*> (on page 25)

<*StiffenerGroup*> (on page 29)

<*SeamGroup*> (on page 39)

<CoordSys>

Defines the local coordinate system for a **<PlanePanel>** or **<CurvedPanel>**. All geometry for the panel is defined by <**CoordSys>**. Smart 3D converts objects to its global coordinate system.

```
<CoordSys>
      <Origin X="2.6136000000E005" Y="0.0000000000E000"
            Z="0.0000000000E000"/>
      <Waxis X="1.0000000000E000" Y="0.0000000000E000"
            Z="0.0000000000E000"/>
      <Uaxis X="0.0000000000E000" Y="1.0000000000E000"
            Z="0.0000000000E000"/>
</CoordSys>
```

NOTE The default coordinate system should be present in the Smart 3D catalog.

<Boundary>

Defines boundary geometry for plates, stiffeners, and the surfaces used to create them.

<PlanePanel>

```
<Boundary>
      <Limit CompId="1">
            <ModelRef ObjType="PlanePanel" ObjId="810-FR135A"
                  CompType="None" CompId="0"/>
            <StartPoint2d U="2.6376000000E005" V="1.5440000000E003"/>
      </Limit>
      <Limit CompId="2">
            <ModelRef ObjType="ShellCurve" ObjId="C1"
                  CompType="None" CompId="0"/>
            <StartPoint2d U="2.6376000000E005" V="2.0443237113E003"/>
      </Limit>
      .
      .
      <SimpleContour>...</SimpleContour>
      <DetailedContour>...</DetailedContour>
</Boundary>
```

<CurvedPanel>

```
<Boundary>
      <Limit CompId="1">
```

```
            <ModelRef ObjType="ShellCurve" ObjId="CGS577"
                  CompType="None" CompId="0"/>
            <StartPoint3d U="2.6126000000E005" V="2.7556088553E003"
                  W="8.6900000000E003"/>
      </Limit>
      <Limit CompId="2">
            <ModelRef ObjType="ShellCurve" ObjId="CGS8"
                  CompType="None" CompId="0"/>
            <StartPoint3d U="2.6126000000E005" V="2.7404006641E003"
                  W="5.0100000000E003"/>
      </Limit>
      .
      .
      <SimpleContour>...</SimpleContour>
</Boundary>
```

<Limit> - Identifies the edges of a surface generated from a simple or detailed contour. A limit is associated with an object identified by its unique **<ModelRef>** values.

<ModelRef> - Identifies an object.

CompId - Defines a unique numeric identifier for the object within the defined value of **CompType**.

ObjType - Defines an object type, such as **PlanePanel**, **CurvedPanel**, or **ShellCurve**.

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

CompType - Defines the type of feature.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

StartPoint3d - Defines the starting node point coordinates in 3D space.

<*SimpleContour*> (on page 45)

<*DetailedContour*> (on page 46)

<PlateGroup>

Defines plates. Smart 3D imports a plate as **CImpPlate**, with object type of **ImpPlateType** and plate type of **ImpPlatePart**.

<PlanePanel>

```
<PlateGroup GroupId="5">
      <Material Grade="A">
            <Thickness>12.0</Thickness>
      </Material>
      <MaterialSide>Forward</MaterialSide>
      <Plate CompId="1" Assembly="1063">
            <Limit>
                  <ModelRef ObjType="PlanePanel" ObjId="810-000"
                        CompType="Limit" CompId="1"/>
                  <StartPoint2d U="2.6886714031E003"
                        V="4.9200000000E003"/>
```

```
            </Limit>
            .
            .
            <SimpleContour>...</SimpleContour>
            <DetailedContour>...</DetailedContour>
            <HoleRef ObjType="PlanePanel" ObjId="810-000"
                  CompType="Hole" CompId="1"/>
            .
            .
            <NotchRef ObjType="PlanePanel" ObjId="810-000"
                  CompType="Notch" CompId="1"/>
            .
            .
            <CutoutRef ObjType="PlanePanel" ObjId="810-000"
                  CompType="Cutout" CompId="13501"/>
            .
            .
      </Plate>
</PlateGroup>
```

<CurvedPanel>

```
<PlateGroup GroupId="2">
      <Material Grade="A">
            <Thickness>27.0</Thickness>
      </Material>
      <MaterialSide>Out</MaterialSide>
      <Plate CompId="1" Assembly="1063">
            <Limit>
                  <ModelRef ObjType="CurvedPanel" ObjId="CG810-1"
                        CompType="Limit" CompId="1"/>
                  <StartPoint3d U="2.6126000000E005"
                        V="3.0915305138E003"
                        W="6.7500000000E003"/>
            </Limit>
            .
            .
            <SimpleContour>...</SimpleContour>
            <FacetSurface>...</FacetSurface>
      </Plate>
      .
      .
</PlateGroup>
```

<Material> - Specifies a material grade as defined in reference data. For more information, see <*Material*> in *Reference Data XML Tags* (on page 20).

<Thickness> - Defines the thickness for the plate.

<MaterialSide> - Defines the thickness direction for the plate.

<Plate> - Contains the plate boundaries, holes and features of a single plate.

<Assembly> - Defines assembly information for the part. This attribute is optional.

<Limit> - Identifies the edges of a surface generated from a simple or detailed contour. A limit is associated with an object identified by its unique **<ModelRef>** values.

<ModelRef> - Identifies an object.

CompId - Defines a unique numeric identifier for the object within the defined value of **CompType**.

ObjType - Defines an object type, such as **PlanePanel**, **CurvedPanel**, or **ShellCurve**.

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

CompType - Defines the type of feature.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

StartPoint3d - Defines the starting node point coordinates in 3D space.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

W - Defines a value along the W-axis of the local coordinate system.

<*SimpleContour*> (on page 45)

<*DetailedContour*> (on page 46)

<*FacetSurface*> (on page 46)

<HoleRef>, **<NotchRef>**, **<CutoutRef>** - Identifies the holes, edge features, and sketched features on the plate. **CompId** points to an item under the appropriate group (**<HoleGroup>**, **<NotchGroup>**, or **<CutoutGroup>**).

<ModelRef> - Identifies an object.

CompId - Defines a unique numeric identifier for the object within the defined value of **CompType**.

ObjType - Defines an object type, such as **PlanePanel**, **CurvedPanel**, or **ShellCurve**.

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

CompType - Defines the type of feature.

<BracketGroup>

Defines brackets. Smart 3D imports a bracket as **CImpPlate**, with object type of **ImpPlateType** and plate type of **ImpBracket**.

```
<BracketGroup GroupId="29">
      <Material Grade="A">
            <Thickness>12.0</Thickness>
      </Material>
      <MaterialSide>Bottom</MaterialSide>
      <Bracket CompId="1" Assembly="1062-00-02">
            <CoordSys>...</CoordSys>
            <SimpleContour>...</SimpleContour>
            <End1>
                  <ModelRef ObjType="ShellProfile" ObjId="CGHULL"
```

```
                        CompType="None" CompId="0"/>
                </End1>
                <End2>
                        <ModelRef ObjType="PlanePanel" ObjId="810-000"
                        CompType="Stiffener" CompId="1"/>
                </End2>
                <FlangeGroup GroupId="1" BendingRadius="25.0"
                        Height="91.3" Thickness="0.0">
                        <Flange CompId="1">
                                <Trace>
                                        <StartPoint2d U="1.3385211077E002"
                                                V="5.8193703888E002"/>
                                        <Segment2d>
                                                <Amplitude2d U="0.0000000000E000"
                                                        V="0.0000000000E000"/>
                                                <Node2d U="1.2309420495E003"
                                                        V="1.4082708389E002"/>
                                        </Segment2d>
                                </Trace>
                                <Inclination>
                                        <Vector3d U="0.0000000000E000"
                                                V="0.0000000000E000"
                                                W="-1.0000000000E000"/>
                                        <Vector3d U="0.0000000000E000"
                                                V="0.0000000000E000"
                                                W="-1.0000000000E000"/>
                                </Inclination>
                        </Flange>
                </FlangeGroup>
        </Bracket>
        .
        .
</BracketGroup>
```

<Material> - Specifies a material grade as defined in reference data. For more information, see <*Material*> in *Reference Data XML Tags* (on page 20).

<Thickness> - Defines the thickness for the plate.

<MaterialSide> - Defines the thickness direction for the plate.

<Bracket> - Contains the boundaries and parameters of a single bracket.

<Assembly> - Defines assembly information for the part. This attribute is optional.

<*CoordSys*> (on page 24)

<*SimpleContour*> (on page 45)

<End1> - Specifies the first bracket support.

<End2> - Specifies the second bracket support.

<ModelRef> - Identifies an object.

CompId - Defines a unique numeric identifier for the object within the defined value of **CompType**.

ObjType - Defines an object type, such as **PlanePanel**, **CurvedPanel**, or **ShellCurve**.

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

CompType - Defines the type of feature.

<FlangeGroup> - Defines bracket flanges.

<Flange> - Contains the boundaries and landing curve of a single bracket flange.

<Trace> - Defines the starting and ending points of the bracket flange.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

<Inclination> - Defines the angle of the bracket flange.

<Vector3d> - Defines the inclination vectors at a node point on **<Trace>**. If two values of **<Vector3D>** are provided for <Inclination>, then the orientation angles are applied at the trace ends. If more than two values of **<Vector3D>** are provided, then the orientation angles are applied at each node of the trace.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

W - Defines a value along the W-axis of the local coordinate system.

<StiffenerGroup>

Defines stiffeners. Stiffeners are created in the same way as the parent plate, as defined for **Instance** on the panel. Smart 3D transforms local coordinates into global coordinates. Smart 3D imports a stiffener as **ImpStiffenerType**, with profile type of **ImpStiffener**.

<PlanePanel>

```
<StiffenerGroup GroupId="13">
      <Material Grade="A">
            <BarShape BarSectionId="FlatBar150*15" BarType="10">
                  <Parameters>150 15</Parameters>
                  <Crossection>
                        <StartPoint2d U="0.0000000000E000"
                              V="0.0000000000E000"/>
                        <Segment2d>
                              <Amplitude2d U="0.0000000000E000"
                                    V="0.0000000000E000"/>
                              <Node2d U="1.5000000000E001"
                                    V="0.0000000000E000"/>
                        </Segment2d>
                        .
                        .
                  </Crossection>
```

```
            </BarShape>
        </Material>
        <Stiffener CompId="1" Assembly="1063">
            <Trace>
                <StartPoint2d U="1.4450000000E003"
                    V="8.7520000000E003"/>
                <Segment2d>
                    <Amplitude2d U="0.0000000000E000"
                        V="0.0000000000E000"/>
                    <Node2d U="1.4450000000E003"
                        V="4.9580000000E003"/>
                </Segment2d>
                .
                .
            </Trace>
            <Offset>12.0</Offset>
            <Inclination>
                <Vector3d U="0.0000000000E000"
                    V="0.0000000000E000" W="1.0000000000E000"/>
                <Vector3d U="0.0000000000E000"
                    V="0.0000000000E000" W="1.0000000000E000"/>
            </Inclination>
            <End1>
                <ModelRef ObjType="PlanePanel" ObjId="810-DK1"
                    CompType="None" CompId="0"/>
            </End1>
            <End2>
                <ModelRef ObjType="PlanePanel" ObjId="810-000"
                    CompType="Boundary" CompId="0"/>
            </End2>
            <Web MaterialDirection="Positive">
                <CoordSys>...</CoordSys>
                <DetailedContour>...</DetailedContour>
            </Web>
            <Flange1 MaterialDirection="Positive">
                <CoordSys>...</CoordSys>
                <DetailedContour>...</DetailedContour>
            </Flange1>
        </Stiffener>
        .
        .
</StiffenerGroup>
```

<CurvedPanel>

```
<StiffenerGroup GroupId="7">
        <Material Grade="A32">
            <BarShape BarSectionId="TBar528*125*13*18" BarType="43">
                <Parameters>528 125 13 18</Parameters>
                <Crossection>
                    <StartPoint2d U="0.0000000000E000"
                        V="0.0000000000E000"/>
                    <Segment2d>
                        <Amplitude2d U="0.0000000000E000"
```

```
                                    V="0.0000000000E000"/>
                              <Node2d U="1.3000000000E001"
                                    V="0.0000000000E000"/>
                        </Segment2d>
                        .
                        .
                  </Crossection>
            </BarShape>
      </Material>
      <Stiffener CompId="1" Assembly="1063">
            <Trace>
                  <StartPoint3d U="2.0181000000E005"
                        V="-1.8200000000E003" W="4.5139159694E000"/>
                  <Segment3d>
                        <Amplitude3d U="5.2180588684E-004"
                              V="0.0000000000E000"
                              W="-2.3897730914E-001"/>
                        <Node3d U="2.0396250000E005"
                              V="-1.8200000000E003"
                              W="9.2138901028E000"/>
                  </Segment3d>
                  .
                  .
            </Trace>
            <Offset>12.0</Offset>
            <Inclination>
                  <Vector3d U="-1.7393986320E-003"
                        V="6.1230225065E-017" W="9.9999848725E-001"/>
                  <Vector3d U="-5.2022241466E-003"
                        V="6.1229489143E-017" W="9.9998646834E-001"/>
            </Inclination>
            <End1/>
            <End2/>
            <Web MaterialDirection="Positive">
                  <CoordSys>...</CoordSys>
                  <DetailedContour>...</DetailedContour>
            </Web>
            <Flange1 MaterialDirection="Positive">
                  <CoordSys>...</CoordSys>
                  <DetailedContour>...</DetailedContour>
            </Flange1>
      </Stiffener>
      .
      .
</StiffenerGroup>
```

<Material> - Specifies a material grade as defined in reference data. For more information, see <*Material*> in *Reference Data XML Tags* (on page 20).

<BarShape> - Defines the profile cross-section for the group.

BarSectionId - Specifies a profile cross-section as defined in the reference data. For more information, see <*BarSection*> in *Reference Data XML Tags* (on page 20).

BarType - Defines a unique identifier for the profile cross-section. Smart 3D maps **BarType** to the **Stiffener Bar Type** property.

<Parameters> - Defines dimension parameters for the profile cross-section.

<Crosssection> - Defines the height of the profile cross-section.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

<Segment3d> - Specifies a segment of the contour in 3D space. The segment can be a straight line or an arc.

Amplitude3d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U, V, and W values are **0** for a straight line.

Node3d - Defines the ending node point coordinates of a contour segment in 3D space.

<Stiffener> - Contains all definitions for a single stiffener.

<Assembly> - Defines assembly information for the part. This attribute is optional.

<Trace> - Defines the landing curve of the stiffener. The plane panel contour or curved panel faceted surface is used for projection of stiffener trace. Smart 3D retrieves the cross-section from the catalog. The left-bottom load point is placed at the start point of the trace and generated along the trace at the specified inclination (orientation angle).

<Offset> - Specifies the offset of the stiffener from the landing curve.

<Inclination> - Defines the orientation angle of the stiffener web from a normal projection from the plate surface.

<Vector3d> - Defines the inclination vectors at a node point on **<Trace>**. If two values of **<Vector3D>** are provided for <Inclination>, then the orientation angles are applied at the trace ends. If more than two values of **<Vector3D>** are provided, then the orientation angles are applied at each node of the trace.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

W - Defines a value along the W-axis of the local coordinate system.

<End1> - Defines the first end cut of the stiffener.

<End2> - Defines the second end cut of the stiffener.

NOTE If the XML cross-section parameters (such as height, width, and web thickness) do not match the mapped Smart 3D cross-section, then end cuts are ignored by Smart 3D. For more information, see *<BarSection>* in *Reference Data XML Tags* (on page 20).

<ModelRef> - Identifies an object.

CompId - Defines a unique numeric identifier for the object within the defined value of **CompType**.

ObjType - Defines an object type, such as **PlanePanel**, **CurvedPanel**, or **ShellCurve**.

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

CompType - Defines the type of feature.

<Web> - Defines the web of a built-up stiffener. This tag is optional.

<Flange1> - Defines the flange of a built-up stiffener. This tag is optional.

NOTE If the XML cross-section parameters (such as height, width, and web thickness) do not match the mapped Smart 3D cross-section, then web and flange contours are ignored by Smart 3D. For more information, see *<BarSection>* in *Reference Data XML Tags* (on page 20).

MaterialDirection - Defines the thickness direction for a web, or the flange direction for a flange.

<*CoordSys*> (on page 24)

<*DetailedContour*> (on page 46)

<PillarGroup>

Defines pillars, which are similar to Smart 3D members. Pillars are created in the same way as the parent plate, as defined for **Instance** on the panel. Smart 3D transforms local coordinates into global coordinates. Smart 3D imports a pillar as **ImpStiffenerType**, with profile type of **ImpPillar**.

```
<PillarGroup GroupId="13">
      <Material Grade="A">
            <BarShape BarSectionId="IBar300*300*11*19" BarType="54">
                  <Parameters>300 300 11 19</Parameters>
                  <Crossection>
                        <StartPoint2d U="0.0000000000E000"
                              V="0.0000000000E000"/>
                        <Segment2d>
                              <Amplitude2d U="0.0000000000E000"
                                    V="0.0000000000E000"/>
                              <Node2d U="1.5000000000E001"
                                    V="0.0000000000E000"/>
                        </Segment2d>
                  </Crossection>
            </BarShape>
      </Material>
      <Pillar CompId="1" Assembly="1063-00_Pillar">
            <Trace>
                  <StartPoint2d U="1.4450000000E003"
                        V="8.7520000000E003"/>
                  <Segment2d>
                        <Amplitude2d U="0.0000000000E000"
                              V="0.0000000000E000"/>
                        <Node2d U="1.4450000000E003"
                              V="4.9580000000E003"/>
                  </Segment2d>
            </Trace>
            <Inclination>
                  <Vector3d U="0.0000000000E000"
```

```
                        V="0.0000000000E000" W="1.0000000000E000"/>
                  <Vector3d U="0.0000000000E000"
                        V="0.0000000000E000" W="1.0000000000E000"/>
            </Inclination>
            <End1 />
            <End2 />
            <Web MaterialDirection="Positive">
                  <CoordSys>...</CoordSys>
                  <DetailedContour>...</DetailedContour>
            </Web>
            <Flange1 MaterialDirection="Negative">
                  <CoordSys>...</CoordSys>
                  <DetailedContour>...</DetailedContour>
            </Flange1>
            <Flange2 MaterialDirection="Negative">
                  <CoordSys>...</CoordSys>
                  <DetailedContour>...</DetailedContour>
            </Flange2>
      </Stiffener>
      .
      .
</PillarGroup>
```

<Material> - Specifies a material grade as defined in reference data. For more information, see <*Material*> in *Reference Data XML Tags* (on page 20).

<BarShape> - Defines the profile cross-section for the group.

BarSectionId - Specifies a profile cross-section as defined in the reference data. For more information, see <*BarSection*> in *Reference Data XML Tags* (on page 20).

BarType - Defines a unique identifier for the profile cross-section. Smart 3D maps **BarType** to the **Stiffener Bar Type** property.

<Parameters> - Defines dimension parameters for the profile cross-section.

<Crosssection> - Defines the height of the profile cross-section.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

<Pillar> - Contains all definitions for a single pillar.

<Assembly> - Defines assembly information for the part. This attribute is optional.

<Trace> - Defines the length and end points of the pillar. Smart 3D retrieves the cross-section from the catalog. The center of web left load point is placed at the start point of the trace and generated along the trace at the specified inclination (orientation angle).

<Inclination> - Defines the orientation angle of the pillar web.

<Vector3D> - Defines the inclination vectors at a node point on <Trace>. If two values of <Vector3D> are provided for <Inclination>, then the orientation angles are applied at the pillar

ends. If more than two values of <Vector3D> are provided, then the orientation angles are applied at each node of the trace.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

W - Defines a value along the W-axis of the local coordinate system.

<Web> - Defines the web of the pillar.

<Flange1> - Defines the top flange of the pillar.

<Flange2> - Defines the bottom flange of the pillar.

NOTE If the XML cross-section parameters (such as height, width, and web thickness) do not match the mapped Smart 3D cross-section, then web and flange contours are ignored by Smart 3D. For more information, see *<BarSection>* in *Reference Data XML Tags* (on page 20).

MaterialDirection - Defines the thickness direction for a web, or the flange direction for a flange.

<*CoordSys*> (on page 24)

<*DetailedContour*> (on page 46)

<FaceplateGroup>

Defines face plates, which are similar to Smart 3D edge reinforcements and typically use flat bar profile cross-sections. Face plates are created in the same way as the parent plate, as defined for **Instance** on the panel. Smart 3D transforms local coordinates into global coordinates. Smart 3D imports a face plate as **ImpStiffenerType**, with profile type of **ImpFacePlate**.

```
<FaceplateGroup GroupId="5">
      <Material Grade="A">
            <BarShape BarSectionId="FlatBar120*10" BarType="10">
                  <Parameters>120 10</Parameters>
                  <Crossection>
                        <StartPoint2d U="0.0000000000E000"
                              V="0.0000000000E000"/>
                        <Segment2d>
                              <Amplitude2d U="0.0000000000E000"
                                    V="0.0000000000E000"/>
                              <Node2d U="1.5000000000E001"
                                    V="0.0000000000E000"/>
                        </Segment2d>
                  </Crossection>
            </BarShape>
      </Material>
      <Faceplate CompId="1" Assembly="1063-00_FacePlate">
            <ModelRef ObjType="PlanePanel" ObjId="CG8520-TMT301A"
                  CompType="Limit" CompId="2"/>
            <Trace>
                  <StartPoint2d U="1.4450000000E003"
                        V="8.7520000000E003"/>
                  <Segment2d>
                        <Amplitude2d U="0.0000000000E000"
```

```
                              V="0.0000000000E000"/>
                        <Node2d U="1.4450000000E003"
                              V="4.9580000000E003"/>
                  </Segment2d>
            </Trace>
            <Offset>4.0</Offset>
            <Inclination>
                  <Vector3d U="0.0000000000E000"
                        V="0.0000000000E000" W="1.0000000000E000"/>
                  <Vector3d U="0.0000000000E000"
                        V="0.0000000000E000" W="1.0000000000E000"/>
            </Inclination>
            <End1 />
            <End2 />
            <Web MaterialDirection="Positive">
                  <CoordSys>...</CoordSys>
                  <DetailedContour>...</DetailedContour>
            </Web>
      </Faceplate>
      .
      .
</FaceplateGroup>
```

<Material> - Specifies a material grade as defined in reference data. For more information, see <*Material*> in *Reference Data XML Tags* (on page 20).

<BarShape> - Defines the profile cross-section for the group.

BarSectionId - Specifies a profile cross-section as defined in the reference data. For more information, see <*BarSection*> in *Reference Data XML Tags* (on page 20).

BarType - Defines a unique identifier for the profile cross-section. Smart 3D maps **BarType** to the **Stiffener Bar Type** property.

<Parameters> - Defines dimension parameters for the profile cross-section.

<Crosssection> - Defines the height of the profile cross-section.

<Faceplate> - Contains all definitions for a single face plate.

<Assembly> - Defines assembly information for the part. This attribute is optional.

<ModelRef> - Identifies an object.

CompId - Defines a unique numeric identifier for the object within the defined value of **CompType**.

ObjType - Defines an object type, such as **PlanePanel**, **CurvedPanel**, or **ShellCurve**.

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

CompType - Defines the type of feature.

<Trace> - Defines the length and end points of the face plate. Smart 3D retrieves the cross-section from the catalog.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

<Offset> - Specifies the offset of the face plate from the plate edge.

<Inclination> - Defines the orientation angle of the face plate.

<Vector3D> - Defines the inclination vectors at a node point on <Trace>. If two values of <Vector3D> are provided for <Inclination>, then the orientation angles are applied at the pillar ends. If more than two values of <Vector3D> are provided, then the orientation angles are applied at each node of the trace.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

W - Defines a value along the W-axis of the local coordinate system.

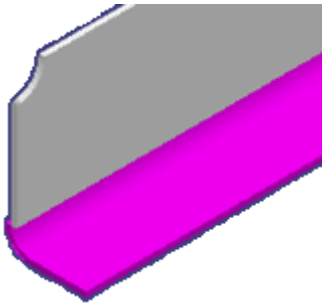
<Web> - Defines the web of the face plate cross-section.

<*CoordSys*> (on page 24)

<*DetailedContour*> (on page 46)

<FlangeGroup>

Defines flange plates at the edge of plates. Flange plates use properties from the parent plate and are created in the same way as the parent plate, as defined for **Instance** on the panel.



```
<FlangeGroup GroupId="7" BendingRadius ="27.5" Height="114.0"
Thickness="8.0">
      <Flange CompId="1" Assembly="1063-00_Flange">
            <ModelRef ObjType="PlanePanel" ObjId="CG8420-T296F"
                  CompType="Limit" CompId="3"/>
            <Trace>
                  <StartPoint2d U="1.4450000000E003"
                        V="8.7520000000E003"/>
                  <Segment2d>
                        <Amplitude2d U="0.0000000000E000"
                              V="0.0000000000E000"/>
                        <Node2d U="1.4450000000E003"
                              V="4.9580000000E003"/>
```

```
                  </Segment2d>
            </Trace>
            <Offset>4.0</Offset>
            <Inclination>
                  <Vector3d U="0.0000000000E000"
                        V="0.0000000000E000" W="1.0000000000E000"/>
                  <Vector3d U="0.0000000000E000"
                        V="0.0000000000E000" W="1.0000000000E000"/>
            </Inclination>
      </Flange>
      .
      .
</FlangeGroup>
```

<Flange> - Contains all definitions for a single flange plate.

<Assembly> - Defines assembly information for the part. This attribute is optional.

<ModelRef> - Identifies an object.

CompId - Defines a unique numeric identifier for the object within the defined value of **CompType**.

ObjType - Defines an object type, such as **PlanePanel**, **CurvedPanel**, or **ShellCurve**.

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

CompType - Defines the type of feature.

<Trace> - Defines the length and end points of the flange plate.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

<Offset> - Offset of the flange plate from the plate edge.

<Inclination> - Defines the orientation angle of the flange plate.

<Vector3D> - Defines the inclination vectors at a node point on <Trace>. If two values of <Vector3D> are provided for <Inclination>, then the orientation angles are applied at the pillar ends. If more than two values of <Vector3D> are provided, then the orientation angles are applied at each node of the trace.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

W - Defines a value along the W-axis of the local coordinate system.

<SeamGroup>

Defines seams on plates. Seams are created in the same way as the parent plate, as defined for **Instance** on the panel. Smart 3D transforms local coordinates into global coordinates. Smart 3D imports a seam as **ImpGenericPart**, with object type of **ImpSeam**.

```
<SeamGroup GroupId="4">
      <Seam CompId="1">
            <Trace>
                  <StartPoint2d U="1.4450000000E003"
                        V="8.7520000000E003"/>
                  <Segment2d>
                        <Amplitude2d U="0.0000000000E000"
                              V="0.0000000000E000"/>
                        <Node2d U="1.4450000000E003"
                              V="4.9580000000E003"/>
                  </Segment2d>
                  .
                  .
            </Trace>
            <End1 />
            <End2 />
      </Seam>
      .
      .
</SeamGroup>
```

<Seam> - Contains the boundaries and landing curve for a single seam.

<Trace> - Defines the landing curve of the seam. The plane panel contour or curved panel faceted surface is used for projection of the stiffener trace.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

<HoleGroup>

Defines holes on a plate. Holes are created in the same way as the parent plate, as defined for **Instance** on the panel. Smart 3D transforms local coordinates into global coordinates. Smart 3D imports a hole as **ImpGenericPart**, with object type of **ImpHole**.

```
<HoleGroup GroupId="21" >
      <HoleShape HoleDefId="D220" HoleType="D" />
            <Parameters>220</Parameters>
      </HoleShape>
      <Hole CompId="1" >
            <Contour>
                  <StartPoint2d U="6.8550000000E003"
                        V="1.9415000000E004" />
                  <Segment2d>
                        <Amplitude2d U="0.0000000000E000"
                              V="0.0000000000E000" />
                        <Node2d U="7.0000000000E003"
                              V="1.9463000000E004" />
                  </Segment2d>
                  .
                  .
            </Contour>
            <Box Length="1.4500000000E002"
                  Width="4.8000000000E001">
                  <Origin U="6.8550000000E003"
                        V="1.9415000000E004" />
                  <BaseVector U="1.0000000000E000"
                        V="0.0000000000E000" />
            </Box>
      </Hole>
      .
      .
</HoleGroup>
```

<HoleShape> - Defines the shape for the hole group.

HoleDefId - Specifies a standard hole as defined in the reference data. For more information, see *<HoleDef>* in *Reference Data XML Tags* (on page 20).

HoleType - Defines a unique identifier for the hole type.

<Parameters> - Defines dimension parameters for the hole.

<Hole> - Contains shape and location definitions for a single hole.

CompId - Defines a unique numeric identifier for the object within the defined value of **HoleType**.

<Contour> - Defines the shape of the hole. The plane panel contour or curved panel faceted surface is used for projection of the hole contour.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

<Box> - Defines a range box containing the contour.

Length - Specifies the length of the range box.

Width - Specifies the width of the range box.

<Origin> - Specifies the origin of the range box in the local coordinate system of the plate.

<BaseVector> - Defines the axis of the local coordinate system that is used as the horizontal axis for the hole.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

<CutoutGroup>

Defines sketched features and profile slots on a plate. Cutouts are created in the same way as the parent plate, as defined for **Instance** on the panel. Smart 3D transforms local coordinates into global coordinates. Smart 3D imports a cutout as **ImpGenericPart**, with object type of **ImpCutout**.

```
<CutoutGroup GroupId="14" >
      <CutoutShape CutoutType="59" />
      <Clips>
            <Material Grade="Default">
                  <Thickness>14.0</Thickness>
            </Material>
            <MaterialSide>Forward</MaterialSide>
      </Clips>
      <Cutout CompId="13001" >
            <ModelRef ObjType="PlanePanel" ObjId="CG456-TBA456"
                  CompType="None" CompId="0" />
            <Contour>
                  <StartPoint2d U="6.8550000000E003"
                        V="1.9415000000E004" />
                  <Segment2d>
                        <Amplitude2d U="0.0000000000E000"
                              V="0.0000000000E000" />
                        <Node2d U="7.0000000000E003"
                              V="1.9463000000E004" />
                  </Segment2d>
                  .
                  .
            </Contour>
            <Box Length="1.4500000000E002"
                  Width="4.8000000000E001">
                  <Origin U="6.8550000000E003"
                        V="1.9415000000E004" />
                  <BaseVector U="1.0000000000E000"
                        V="0.0000000000E000" />
                        </Box>
```

```
            <ClipMould>
                  <CoordSys>...</CoordSys>
                  <Contour>...</Contour>
            </ClipMould>

            <ClipNonMould>
                  <CoordSys>...</CoordSys>
                  <Contour>...</Contour>
            </ClipNonMould>

            <ClipTop>
                  <CoordSys>...</CoordSys>
                  <Contour>...</Contour>
            </ClipTop>
      </Cutout>
      .
      .
</CutoutShapeGroup>
```

<CutoutShape> - Defines the shape for the cutout group.

GroupId - Specifies a standard cutout as defined in the reference data. For more information, see <*CutoutDef*> in *Reference Data XML Tags* (on page 20).

CutoutType - Defines a unique identifier for the cutout type.

<Cutout> - Contains shape and location definitions for a single cutout.

<ModelRef> - Identifies an object.

CompId - Defines a unique numeric identifier for the object within the defined value of **CompType**.

ObjType - Defines an object type, such as **PlanePanel**, **CurvedPanel**, or **ShellCurve**.

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

CompType - Defines the type of feature.

<Contour> - Defines the shape of the cutout. The plane panel contour or curved panel faceted surface is used for projection of the cutout contour.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

<Box> - Defines a range box containing the contour.

Length - Specifies the length of the range box.

Width - Specifies the width of the range box.

<Origin> - Specifies the origin of the range box in the local coordinate system of the plate.

<BaseVector> - Defines the axis of the local coordinate system that is used as the horizontal axis for the hole.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

<Clips> - Contains material and material side definition of the clips in the cutoutgroup.

<Material> - Specifies a material grade as defined in the reference data.

<Thickness> - Defines the thickness for the clip.

<MaterialSide> - Defines the thickness direction for the clip.

<ClipMould> - Defines clips that are located on the molded side of the profile. These are imported as plate parts in **Smart 3D**.

<ClipNonMould> - Defines clips that are located on the non-molded side of the profile. These are imported as plate parts in **Smart 3D**.

<ClipTop> - Defines clips that are located on the top of the profile. These are imported as plate parts in **Smart 3D**.

<NotchGroup>

Defines edge and corner features on a plate. Notches are created in the same way as the parent plate, as defined for **Instance** on the panel. Smart 3D transforms local coordinates into global coordinates. Smart 3D imports a notch as **ImpGenericPart**, with object type of **ImpNotch**.

```
<NotchGroup GroupId="8" >
      <NotchShape NotchDefId="KS8" NotchType="KS" />
            <Parameters>8</Parameters>
      </NotchShape>
      <Notch CompId="13001" >
            <ModelRef ObjType="PlanePanel" ObjId="CG456-LB456"
                  CompType="Boundary" CompId="5" />
            <Contour>
                  <StartPoint2d U="6.8550000000E003"
                        V="1.9415000000E004" />
                  <Segment2d>
                        <Amplitude2d U="0.0000000000E000"
                              V="0.0000000000E000" />
                        <Node2d U="7.0000000000E003"
                              V="1.9463000000E004" />
                  </Segment2d>
                  .
                  .
            </Contour>
            <Box Length="1.4500000000E002"
                  Width="4.8000000000E001">
                  <Origin U="6.8550000000E003"
                        V="1.9415000000E004" />
                  <BaseVector U="1.0000000000E000"
                        V="0.0000000000E000" />
            </Box>
```

```
        </Notch>
        .
        .
</NotchGroup>
```

<NotchShape> - Defines the shape for the notch group.

NotchDefId - Specifies a standard notch as defined in the reference data. For more information, see <*NotchDef*> in *Reference Data XML Tags* (on page 20).

NotchType - Defines a unique identifier for the notch type.

<Parameters> - Defines dimension parameters for the notch.

<Notch> - Contains shape and location definitions for a single notch.

<ModelRef> - Identifies an object.

CompId - Defines a unique numeric identifier for the object within the defined value of **CompType**.

ObjType - Defines an object type, such as **PlanePanel**, **CurvedPanel**, or **ShellCurve**.

ObjId - Defines a unique name for an object. Smart 3D maps **ObjId** to the **Node Type** property and uses it to track existing objects during re-import to determine if an object is new.

CompType - Defines the type of feature.

<Contour> - Defines the shape of the notch. The plane panel contour or curved panel faceted surface is used for projection of the notch contour.

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

<Box> - Defines a range box containing the contour.

Length - Specifies the length of the range box.

Width - Specifies the width of the range box.

<Origin> - Specifies the origin of the range box in the local coordinate system of the plate.

<BaseVector> - Defines the axis of the local coordinate system that is used as the horizontal axis for the hole.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

<SimpleContour>

Defines the surface used for the creation of plate and stiffener geometry on a panel. When the contour is not closed or the contour segments are not continuous within tolerances, Smart 3D joins the segments with a straight line. Smart 3D also transforms local coordinates into global coordinates.

<PlanePanel>

```
<SimpleContour>
      <StartPoint2d U="2.6886714031E003" V="4.9200000000E003"/>
      <Segment2d>
            <Amplitude2d U="1.1553376810E-001"
                  V="-4.2310742536E-002"/>
            <Node2d U="2.7179689795E003" V="5.0000000000E003"/>
      </Segment2d>
      .
      .
</SimpleContour>
```

<CurvedPanel>

```
<SimpleContour>
      <StartPoint3d U="2.6366000000E005" V="2.6491885507E003"
            W="6.7500000000E003"/>
      <Segment3d>
            <Amplitude3d U="0.0000000000E000" V="1.2147694455E000"
                  W="-2.0552576995E-001"/>
            <Node3d U="2.6366000000E005" V="2.6108302154E003"
                  W="6.5232813081E003"/>
      </Segment3d>
      .
      .
</SimpleContour>
```

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

StartPoint3d - Defines the starting node point coordinates in 3D space.

<Segment3d> - Specifies a segment of the contour in 3D space. The segment can be a straight line or an arc.

Amplitude3d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U, V, and W values are **0** for a straight line.

Node3d - Defines the ending node point coordinates of a contour segment in 3D space.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

W - Defines a value along the W-axis of the local coordinate system.

<DetailedContour>

Defines the detailed surface used for the creation of planar plate and stiffener geometry on a panel. Smart 3D transforms local coordinates into global coordinates.

```
<DetailedContour>
      <StartPoint2d U="2.6886714031E003" V="4.9200000000E003"/>
      <Segment2d>
            <Amplitude2d U="1.1553376810E-001"
                  V="-4.2310742536E-002"/>
            <Node2d U="2.7179689795E003" V="5.0000000000E003"/>
      </Segment2d>
      .
      .
</DetailedContour>
```

StartPoint2d - Defines the starting node point coordinates in the 2D U-V plane.

<Segment2d> - Specifies a segment of the contour in the 2D U-V plane. The segment can be a straight line or an arc.

Amplitude2d - Defines the distance of the midpoint of a segment from a line drawn between the node points. The U and V values are **0** for a straight line.

Node2d - Defines the ending node point coordinates of a contour segment in the 2D U-V plane.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

<FacetSurface>

Defines the detailed b-spline surface used for the creation of curved plate and stiffener geometry on a panel.

```
<FacetSurface>
      <StripRow>
            <Point U="2.6126000000E005" V="2.7404006641E003"
                  W="5.0100000000E003"/>
            <Point U="2.6126000000E005" V="2.8108924015E003"
                  W="5.2211945037E003"/>
            .
            .
      </StripRow>
      .
      .
</FacetSurface>
```

<StripRow> - Specifies a surface patch of the facet surface.

<Point> - Defines a point on the surface patch.

U - Defines a value along the U-axis of the local coordinate system.

V - Defines a value along the V-axis of the local coordinate system.

W - Defines a value along the W-axis of the local coordinate system.

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